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JC530 U.S. PTO
09/301624 PTO
04/29/99

TO: Assistant Commissioner for Patents
Box Patent Applications
Washington D.C. 20231

Attorney Docket No. 016794/0383
(must include alphanumeric codes if no inventors named)

UTILITY PATENT APPLICATION TRANSMITTAL
(new nonprovisional applications under 37 CFR 1.53(b))

Transmitted herewith for filing is the patent application of:

INVENTOR(S): Siegfried MATUSCH and Mario WINNEMUTH

TITLE: METHOD AND DEVICE FOR CLEARING THE CRYSTALLINE MATERIAL OUT OF A CENTRIFUGE BASKET

In connection with this application, the following are enclosed:

APPLICATION ELEMENTS:

XX Specification - 13 TOTAL PAGES

(preferred arrangement:)

- Descriptive Title of the Invention
- Cross Reference to Related Applications
- Statement Regard Fed sponsored R&D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

XX Drawings - Total Sheets 2

XX Declaration and Power of Attorney - Total Sheets 2

XX Newly executed (original or copy)

Copy from a prior application (37 CFR 1.63(d))

(relates to continuation/divisional boxes completed) - NOTE: Box below

DELETION OF INVENTOR(S) - Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).

Incorporation By Reference (useable if copy of prior application Declaration being submitted)

The entire disclosure of the prior application, from which a COPY of the oath or declaration is supplied as noted above, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

Microfiche Computer Program (Appendix)

Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)

Computer Readable Copy

Paper Copy (identical to computer copy)

Statement verifying identify of above copies

ACCOMPANYING APPLICATION PARTS

Assignment Papers (cover sheet & document(s))

37 CFR 3.73(b) Statement (when there is an assignee)

English Translation Document (if applicable)

Information Disclosure Statement(IDS) with PTO-1449. Copies of IDS Citations

Preliminary Amendment
 Return Receipt Postcard (MPEP 503)
 Small Entity Statement(s)
 Statement file in prior application, status still proper and desired.
 Certified Copy of Priority Document(s) with Claim of Priority
(if foreign priority is claimed).
 OTHER: Check for \$800.00

If a CONTINUING APPLICATION, check appropriate box and supply the requisite information:

Continuation Divisional Continuation-in-part (CIP)
of prior application Serial No. ____.

Amend the specification by inserting before the first line the following sentence: --This application is a _____ continuation, _____ divisional or _____ continuation-in-part of application Serial No. _____, filed ____.--

CORRESPONDENCE ADDRESS:

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FEE CALCULATIONS: (Small entity fees indicated in parentheses.)

(1) For	(2) Number Filed	(3) Number Extra	(4) Rate	(5) Basic Fee \$760 (\$380)
Total Claims	17 - 20 =	0	x \$18 (x \$9)	0.00
Independent Claims	3 - 3 =	0	x \$78 (x \$39)	0.00
Multiple Dependent Claims			\$260 (\$130)	0.00
Assignment Recording Fee per property			\$40	40.00
			TOTAL FEE:	\$800.00

METHOD OF PAYMENT:

A check in the amount of the above TOTAL FEE is attached. If payment is enclosed, this amount is believed to be correct; however, the Commissioner is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 19-0741.

Respectfully submitted,



Richard L. Schwaab
Reg. No. 25,479

Date: April 29, 1999
Docket No.: 016794/0383

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No. 016794/0383

In re patent application of

Siegfried MATUSCH et al.

Serial No. Unassigned

Filed: April 29, 1999

For: METHOD AND DEVICE FOR CLEARING THE CRYSTALLINE
MATERIAL OUT OF A CENTRIFUGE BASKET

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application, Applicants respectfully request that the following amendments be entered into the application:

IN THE CLAIMS:

Claim 17, line 1, delete "17" and insert --15--.

Claim 18, line 1, delete "18" and insert --16--.

Claim 19, line 1, delete "19" and insert --17--.

REMARKS

Entry of the foregoing amendments prior to examination is respectfully requested.

The Examiner is respectfully requested to enter the above amendments prior to examination of the instant application. The amendments are made to correct clerical

Attorney Docket No. 016794/0383

and grammatical errors and do not to change the scope of the invention.

Respectfully submitted,

April 29, 1999
Date


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Reg. No. 25,479

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METHOD AND DEVICE FOR CLEARING THE CRYSTALLINE MATERIAL OUT OF A CENTRIFUGE BASKET

Background of the Invention

Field of the Invention

The invention relates to a method and device for clearing the product from of a centrifuge basket of a discontinuous centrifuge in which a scraper blade is pivoted toward the spun-off layer of product and, in this area, 5 scrapes the product from the basket with a cutting edge, which is directed in a direction opposite to the rotation direction of the basket.

Description of Related Art

In a known embodiment, the clearing device includes a plow share that is pivotable about a vertical clearing rod. A scraper blade is resiliently and 10 rotatably mounted to the plow share. The scraper blade, which extends over only a short section of the overall height of the centrifuge basket, is pressed into the layer of product (e.g., a layer of sugar) in a direction that is opposite to the rotation direction of the centrifuge basket until it comes to bear against the working sieve. The scraper blade is then moved axially downward out of its top 15 position toward the basket base, and is then moved axially back upward, before returning to its initial position.

Summary of the Invention

It is a general object of the invention to provide an improved device for removing product from the inside of a centrifuge basket.

20 A further object of the invention is to provide an improved process for removing product from the inside of a centrifuge basket.

It is a specific object of the invention to optimize product removal efficiency.

It is another object of the invention to reduce the time required to remove the product from the inner wall of the centrifuge basket.

It is still another object of the invention to reduce the amount of residual product that remains in the centrifuge basket upon completing the 5 removal process.

A preferred embodiment of the inventive process which is intended to accomplish at least some of the foregoing objects includes first pivoting the scraper blade toward an inner wall of the basket, wherein the scraper blade lies in a direction opposite to a rotation direction of the basket, and 10 wherein the scraper blade contacts the product over approximately the entire height of the wall of the basket; scraping the product from the basket wall; ceasing the pivoting of the scraper blade when the cutting edge reaches a desired position prior to touching the inner wall of the basket; and pivoting the scraper blade away from the basket wall.

15 A preferred embodiment of the inventive device which is intended to accomplish at least some of the foregoing objects includes a clearing rod having an axis at least generally parallel to the rotational axis of the basket; and a scraper blade, having a cutting edge, pivotably mounted on the clearing rod for pivoting about the axis of the clearing rod, wherein the cutting edge, after the 20 scraper blade is pivoted in a direction toward the inner wall of the centrifuge basket, extends over approximately the entire height of the centrifuge basket.

Additional objects, features, and advantages of the invention will become apparent from the following description of preferred embodiments of the invention.

25 **Brief Description of the Drawings**

The accompanying drawings, which are incorporated in and constitute part of the specification, illustrate presently preferred embodiments of the invention, and, together with the above general description and the following detailed description, serve to explain the principles of the invention.

Figure 1 is a vertical section through the center of the left half of the centrifuge basket of a discontinuous centrifuge having a clearing-out device projecting into the centrifuge vertically from above and is in the raised position with the scraper blade pivoted away from the wall;

5 Figure 2 is a plane view of the illustration in accordance with Figure 1;

Figure 3 is the same illustration as that of Figure 1, but with the clearing-out device in the lowered position and with the scraper blade pivoted toward the wall;

10 Figure 4 is a plane view of the illustration in accordance with Figure 3, and

Figure 5 is a horizontal section, on an enlarged scale compared to that of Figures 1 to 4, through the scraper blade in the position in which it is pivoted toward the wall.

15 **Detailed Description of the Preferred Embodiments**

The preferred embodiments of the method according to the invention preferably include pivoting a scraper blade toward the wall of the centrifuge basket such that the scraper blade contacts the product which lines the inside of the centrifuge basket. The scraper blade preferably will be in contact with the product over virtually the entire height of the basket. While the scraper blade contacts the product, it is preferably scraping the product off in layers as the centrifuge rotates at its clearing speed. When the product has been substantially completely removed from the centrifuge basket and the scraper blade reaches the basket sieve, the scraper blade is pivoted away from the wall. As a result, after the scraper blade has been pivoted toward the wall, the scraping begins simultaneously over the entire height of the drum, thus reducing the removal time and making the removal of product more even.

A preferred embodiment of the method of the invention intended to accomplish at least some of the foregoing objects includes lowering a scraper blade having a cutting edge from an initial position until the scraper blade nearly touches a base of the centrifuge basket; pivoting the scraper blade toward an inner wall of the basket, wherein the scraper blade lies in a direction opposite to a rotation direction of the basket, and wherein the scraper blade contacts the product over approximately the entire height of the wall of the basket; scraping the product from the basket in a plurality of layers; ceasing the pivoting of the scraper blade toward the wall when the cutting edge approximately touches the inner wall of the basket; pivoting the scraper blade outward; and raising the scraper blade away from the base of the centrifuge basket into the initial position.

A preferred embodiment of the product clearing device according to the invention and for practicing the above method includes a vertically displaceable clearing rod having an axis; and a scraper blade, having a cutting edge, mounted to the clearing rod, wherein the scraper blade pivots about the axis of the clearing rod, and wherein the cutting edge, after the scraper blade is pivoted in a direction toward the wall, extends over approximately an entire height of the centrifuge basket.

To prevent the centrifuge from hitting the clearing device when the centrifuge is shaking, it is preferable if the scraper blade, before being pivoted toward the wall, is axially lowered slightly into the centrifuge basket to the basket base. After the scraper blade is pivoted away from the wall, it is raised again from the basket base by a corresponding axial distance. This axial distance, for example, may be about 200 mm, so that the scraper blade, in its at-rest or initial position, is at a sufficient distance from the internal mechanisms of the centrifuge and from the basket edge. To reduce the clearing time, it is preferable if the scraper blade is lowered into the centrifuge basket while the basket is decelerating from its spin-off speed to its clearing speed.

According to the invention, the efficiency of the product removal is increased if the scraper blade is pivoted toward the wall in the direction of rotation of the centrifuge basket and is pivoted away from the wall in the opposite direction to this direction of rotation. Pivoting the blade away from the

5 wall in the opposite direction to the direction of rotation of the basket adds the residual product on the bottom edge of the scraper blade to the product removed.

To reduce the wear on the working sieve and on the scraper blade, it is preferable if the pivoting of the scraper blade toward the wall is terminated just before the scraper blade comes into metal-to-metal contact with the basket

10 sieve. After the cutting edge of the scraper blade reaches the inner wall or basket sieve of the centrifuge basket, to increase the efficiency of product removal, it is desirable to hold the scraper blade in place for a dwell time, which is preferably only a few seconds, e.g., 2-5 seconds.

In order to transport the product away without problems during

15 the scraping operation, the scraper blade (in horizontal section) is preferably slightly concave on its front side. Moreover, to reduce wearing of the cutting edge of the scraper blade and to achieve gentle cleaning of the sieve, it is advantageous if the cutting edge of the scraper blade forms an angle between 80° to slightly less than 90° with respect to the basket sieve or the basket shell.

20 The scraper blade preferably may be controlled pneumatically by means of electropneumatic valves. It is also preferable, to prevent product from accumulating on the scraper blade and to optimize the product flow, to provide the scraper blade with a nonstick coating.

It is also preferable, particularly with respect to sugar centrifuges,

25 to provide a tubular clearing rod having a nozzle stem, or individual nozzles, for adding wash-water to the sugar. This makes it possible to eliminate an entire subassembly from the product chamber of a sugar centrifuge.

Referring now to the drawings, wherein like numerals indicate like parts, and initially to Figure 1, there will be seen a centrifuge basket 1 having a basket shell 2, which is provided with holes and is covered on its inner wall by a working sieve (not shown in more detail). The base 3 of the basket has 5 a central product discharge opening, which can be closed off by a closure cap (not shown in more detail). The direction of rotation of the centrifuge basket 1 is indicated by an arrow 5.

There is also a clearing-out device, which is arranged in a stationary, eccentric position, or initial position, and of which only an axially 10 parallel clearing rod 6 and a scraper blade 7, which is attached to this clearing rod 6, are shown. The clearing-out device projects into the centrifuge basket 1 vertically from above. By rotating the clearing rod 6 in the direction of the arrow 8 shown in Figures 3 and 4, the scraper blade 7 is pivoted toward the basket shell 2.

15 Figure 3 shows the clearing-out device in its lowered position, in which the scraper blade 7, which extends over the entire height "h" of the basket, has been lowered to the base 3 of the basket. Moreover, Figures 3 and 4 show the scraper blade 7 in its position pivoted toward the wall, in which, at the start of the clearing-out operation, it bears against a layer of product 9, e.g., 20 sugar.

Figure 5 shows the scraper blade 7 in its position after the scraping operation has been completed, pivoted away from the basket wall. The cutting edge 7a of the scraper blade 7 is situated directly in front of the working sieve (not shown in more detail) of the basket shell 2. The cutting edge does not 25 contact the working sieve. The cutting edge 7a when it is in its position pivoted toward the wall forms an angle α with respect to the basket sieve or the basket shell 2, which angle α is preferably between 80° and slightly less than 90° . As also shown in Figure 5, the scraper blade 7, when seen in horizontal section, is slightly concave on its front side 7b.

In one application using a centrifuge, the magma, which is added to the centrifuge basket 1, is spun off in the centrifuge basket 1, which is driven at a high rotational speed. The mother liquor, which adheres to the crystals passing through the working sieve, runs through the holes of the basket shell 2 into the centrifuge casing (not shown in more detail). Then the crystals are washed with a clean liquid. The crystals remaining after the separation process in the basket form a layer of sugar 9, i.e., the product, which is scraped off the working sieve by the clearing-out device. After the closure cap has been opened, the sugar crystals which have been scraped off, are fed downstream on conveyor units.

Figure 1 shows the clearing-out device in the raised position in which the bottom end of the scraper blade 7, in its position pivoted away from the wall, is at an axial distance "a" from the basket base 3, which distance "a" is preferably approximately 200 mm. The scraper blade 7 is lowered axially from this at-rest position, in the direction of the arrow 10, until the bottom end of the scraper blade 7 lies directly above the basket base 3, as shown in Figure 3. As noted above, to increase the efficiency of the product removal process, the scraper blade preferably is lowered while the centrifuge is decelerating from its spinning speed to its clearing speed. After the lowered position and the clearing speed have been reached, the scraper blade 7 is then pivoted toward the wall in the direction of the arrow 8.

Figure 4 shows that the scraper blade 8 is pivoted toward the wall in the direction of rotation 5 of the centrifuge basket 1. The sugar crystals are then scraped off simultaneously over the entire height "h" of the basket with the scraper blade 7 being continuously fed radially toward the wall. The dashed line 11 shown in front of the scraper blade 7 indicates the product flow of the crystals which are being scraped from the layer of sugar 9 by the scraper blade 7. When the scraper blade 7 has reached its limit position as shown in Figure 5, the scraper blade then rests in this limit position for a few seconds before being pivoted away from the wall to its starting position, which is illustrated in Figures

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1 and 2. By pivoting the scraper blade 7 away in a direction that is opposite to the direction of rotation 5 of the centrifuge basket 1, the residual sugar or product on the bottom edge of the scraper blade 7 is moved to the central discharge opening in the base 3 of the basket. Then, the clearing rod 6, together
5 with the scraper blade 7, is raised again axially by the distance "a," into the at-rest position shown in Figure 1.

After reading and understanding the foregoing description it will be appreciated that there are several distinct advantages in connection with the subject invention. Additional advantages and modifications will readily occur to
10 those skilled in the art. The invention in its broadest aspects therefore is not limited to the specific details and preferred embodiments shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims.

15 German Patent Application 198 19 065.4, filed April 29, 1998, is hereby incorporated by reference in its entirety.

What is claimed is:

1. A method for clearing product from a centrifuge basket, comprising:

first pivoting the scraper blade toward an inner wall of the basket, wherein the scraper blade lies in a direction opposite to a rotation direction of the basket, and wherein the scraper blade contacts the product over approximately the entire height of the wall of the basket;

scraping the product from the basket wall;

ceasing the pivoting of the scraper blade when the cutting edge reaches a desired position prior to touching the inner wall of the basket; and

pivoting the scraper blade away from the basket wall.

2. A method for clearing product from a centrifuge basket as claimed in claim 1, further comprising:

lowering a scraper blade having a cutting edge from an initial position, prior to the first pivoting, until the scraper blade nearly touches a base of the centrifuge basket; and

raising the scraper blade away from the base of the centrifuge basket into the initial position after the scraper plate has been pivoted away from the wall.

3. A method for clearing product from a centrifuge basket as claimed in claim 1, wherein part of the scraper blade remains in the centrifuge basket when it is in its initial position.

4. A method for clearing product from a centrifuge basket as claimed in claim 1, wherein the scraper blade is lowered while the centrifuge basket is decelerating from a spin-off speed to a clearing speed.

5. A method for clearing product from a centrifuge basket as claimed in claim 1, further comprising holding the scraper blade near the inner wall for a period of time prior to being pivoted away from the wall.

6. A method for clearing the product from a centrifuge basket as claimed in claim 1, wherein said first pivoting has a pivoting direction that is the same as the rotation direction of the centrifuge basket.

7. A method for clearing the product from a centrifuge basket as claimed in claim 1, wherein said pivoting away has a pivoting direction that is opposite from the rotation direction of the centrifuge basket.

8. A method for clearing product from a centrifuge basket as claimed in claim 1, wherein the pivoting of the scraper blade is pneumatically controlled.

9. A method for clearing product from a centrifuge basket as claimed in claim 2, wherein the initial position is approximately 200 mm from the base of the centrifuge basket.

10. A clearing device for removing product from a centrifuge basket, comprising:

a clearing rod having an axis at least generally parallel to the rotational axis of the basket; and

a scraper blade, having a cutting edge, pivotably mounted on the clearing rod for pivoting about the axis of the clearing rod,

wherein the cutting edge, after the scraper blade is pivoted in a direction toward the inner wall of the centrifuge basket, extends over approximately the entire height of the centrifuge basket.

11. A clearing device as claimed in claim 10, wherein the scraper blade has a concave face.

12. A clearing device as claimed in claim 10, wherein the scraper forms an angle with the inner wall of the centrifuge basket.

13. A clearing device as claimed in claim 12, wherein the angle is between 80° and 90°.

14. A cleaning device as claimed in claim 10, wherein the scraper blade has a nonstick coating.

17. A clearing device as claimed in claim 10, wherein the clearing rod is tubular and includes a nozzle for adding water to the centrifuge basket.

18. A clearing device as claimed in claim 10, further comprising means for displacing the clearing rod along its axis.

19. A centrifuge comprising:

a centrifuge basket having an inner wall and a central product discharge opening;

a closure cap for covering the central product discharge opening while the centrifuge is being operated; and

a clearing device for removing a product from the centrifuge basket including:

a vertically displaceable clearing rod having an axis; and

a scraper blade, having a cutting edge, mounted to the clearing rod,

wherein the scraper blade pivots about an axis of the clearing rod, and

wherein the cutting edge, after the scraper blade is pivoted in a direction toward the inner wall of the basket, extends over approximately an entire height of the centrifuge basket.

Abstract of the Disclosure

The invention relates to a method and a device for clearing product, e.g., sugar, from the inside of a centrifuge basket of a discontinuous 5 centrifuge. A scraper blade, which is attached to a clearing rod, is pivoted toward the spun-off layer of product. The scraper blade scrapes off the product with a cutting edge, which is directed in a direction that is opposite to the direction of rotation of the basket. To optimize the product removal, it is preferable if the scraper blade, after it has been pivoted inward, contacts the 10 product over virtually the entire height of the basket and at the same time scrapes off the product from the layer of product which is rotating at the clearing rotational speed in layers over the entire height of the basket. Once the product has been substantially completely removed from the basket, the scraper blade is pivoted back away from the basket wall.

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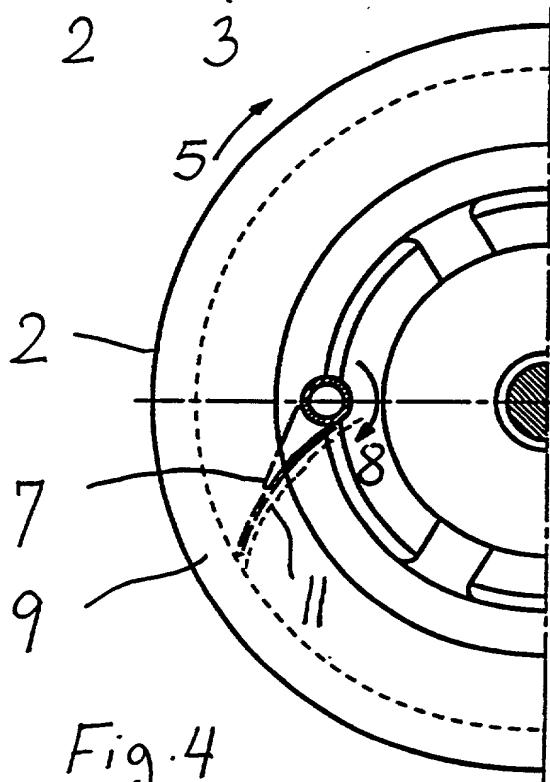
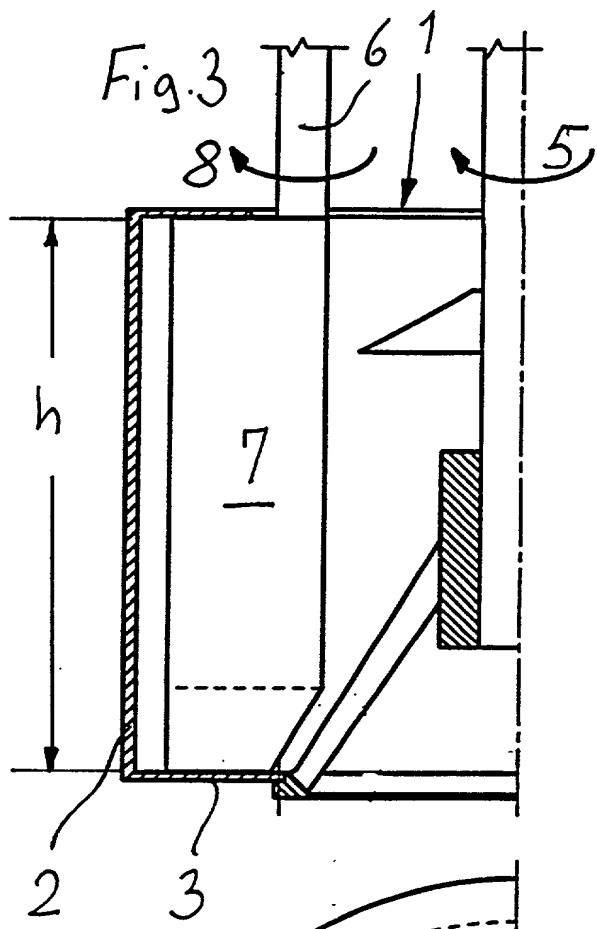
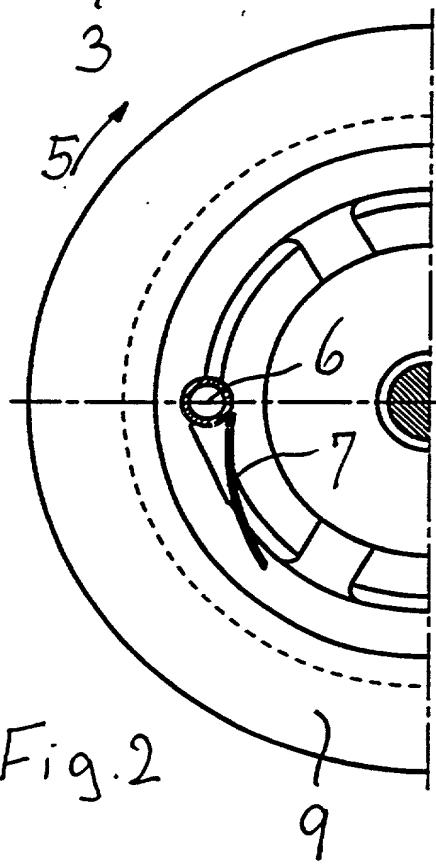
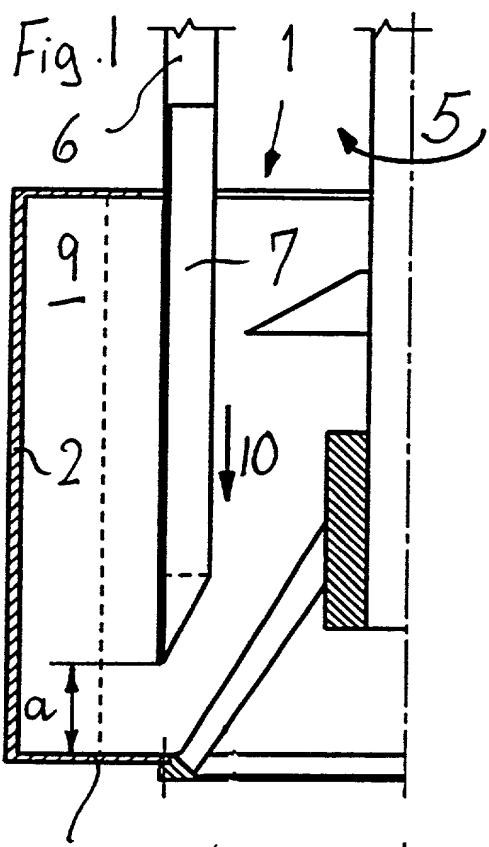
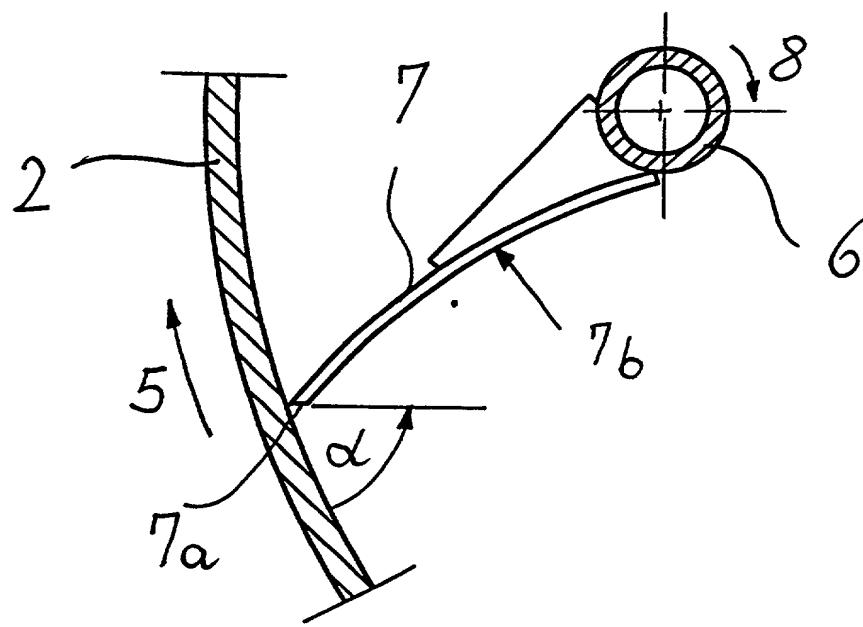


Fig. 5



DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD AND DEVICE FOR CLEARING THE CRYSTALLINE MATERIAL OUT OF A CENTRIFUGE BASKET

the specification of which is attached hereto unless the following box is checked:

was filed on _____ as United States Application Number or PCT International Application Number _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is known by me to be material to patentability as defined in Title 37, Code of Federal Regulations § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

PRIOR FOREIGN APPLICATION(S)

NUMBER	COUNTRY	DAY/MONTH/YEAR FILED	PRIORITY CLAIMED
198 19 065.4	Federal Republic of Germany	29 April 1998	YES

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

APPLICATION NO.	FILING DATE

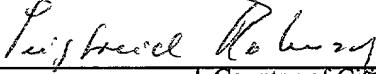
I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is known by me to be material to patentability as defined in Title 37, Code of Federal Regulations § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

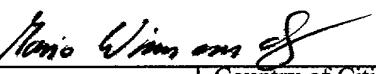
APPLICATION SERIAL NO.	FILING DATE	STATUS: PATENTED, PENDING, ABANDONED

I hereby appoint as my attorneys, with full powers of substitution and revocation, to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: Stephen A. Bent, Reg. No. 29,768; David A. Blumenthal, Reg. No. 26,257; William T. Ellis, Reg. No. 26,874; John J. Feldhaus, Reg. No. 28,822; Patricia D. Granados, Reg. No. 33,683; John P. Isaacson, Reg. No. 33,715; Michael D. Kaminski, Reg. No. 32,904; Kenneth E. Krosin, Reg. No. 25,735; Eugene M. Lee, Reg. No. 32,039; Richard Linn, Reg. No. 25,144; Peter G. Mack, Reg. No. 26,001; Brian J. McNamara, Reg. No. 32,789; Sybil Meloy, Reg. No. 22,749; George E. Quillin, Reg. No. 32,792; Colin G. Sandercock, Reg. No. 31,298; Bernhard D. Saxe, Reg. No. 28,665; Charles F. Schill, Reg. No. 27,590; Richard L. Schwaab, Reg. No. 25,479; Arthur Schwartz, Reg. No. 22,115; Harold C. Wegner, Reg. No. 25,258.

Address all correspondence to Foley & Lardner, 3000 K Street, N.W., Suite 500, P.O. Box 25696, Washington, D.C. 20007-8696. Address telephone communications to Richard L. Schwaab at (202) 672-5414.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of First or Sole Inventor Siegfried MATUSCH	Signature of First or Sole Inventor 	Date 13.04.99
Residence Address Braunschweig, Federal Republic of Germany	Country of Citizenship Federal Republic of Germany	
Post Office Address Kauzwinkel 6, D-38108, Braunschweig, Federal Republic of Germany		

Full Name of Second Inventor Mario WINNEMUTH	Signature of Second Inventor 	Date 13.04.99
Residence Address Hannover, Federal Republic of Germany	Country of Citizenship Federal Republic of Germany	
Post Office Address Wittekamp 14, D-30177, Hannover, Federal Republic of Germany		

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